

**AAPG Annual Convention
Salt Lake City, Utah
May 11-14, 2003**

Alan R. Carroll and Jeffrey T. Pietras, University of Wisconsin, Madison, WI

Source Rock Heterogeneity of the Eocene Green River Formation Estimated from Fischer Assay Analysis

Fischer assay, a pyrolysis technique similar in many respects to Rock Eval, provides a unique and underutilized tool for assessing petroleum source rock heterogeneity in lacustrine mud rocks. For the White Mountain #1 core in the central Green River basin, Fischer assay gallons/ton (GPT) correlate with both total organic carbon (TOC) and Rock Eval S2, with correlation coefficients of 0.73. Much of the variance between these techniques is probably due to homogenization of Fischer assay samples over intervals of ~ 30 cm. In contrast, TOC and Rock Eval samples represent isolated intervals of ~ 1 cm. Fischer assay may thus provide a more accurate representation of bulk generative potential than Rock Eval. Within the evaporative Wilkins Peak Member, Fischer assay GPT varies predictably with facies evidence for lake expansion and contraction, with the highest values corresponding to profundal facies. Fluctuating profundal facies of the Laney and Tipton Members on average yield 2-3 times as many GPT as the Wilkins Peak Member. However, the highest GPT, S2, and %TOC measurements are essentially identical in each member. Average net organic matter accumulation rates also appear to have been the same in each member, based on integrated GPT values and radioisotopic dating of interbedded tuff horizons. This surprising result indicates that higher rates of inorganic sediment accumulation during deposition of the Wilkins Peak Member may have been chiefly responsible for its lower average organic matter content, rather than previously suspected paleolimnologic factors such as water column stratification or nutrient supply.